REMARKS

Claims 1-37 remain in the application. Independent claims 1 and 22 have been amended to recite that the "compartment adjacent to the cathode is formed by the second bipolar membrane and the cathode". Support for this amendment is found in the specification and in Figures 1-3. Figs. 1-3 represent electrochemical cells having 4 compartments, 5 compartments and 8 compartments, respectively. The membrane immediately adjacent to the cathode in each cell is the second bipolar membrane 14. The descriptions of the electrochemical cells describing the presence of the second bipolar membrane 14 is found in the specification at pages 14-17. The Examiner is requested to enter these amendments.

Claims 4, 15, 23 and 29 have also been amended. With regard to the amendments to the formulas present in claims 4, 15, 23 and 29, the formulas in each of these claims has been amended to correct an inadvertent typographical error. As would be apparent to one of ordinary skill in the art, each of the formulas present in claims 4, 15, 23 and 29 should have brackets around the positive ion. As such, the amendments to the formulas of claims 4, 15, 23 and 29 were not made for any reason relating to the patentability of claims 4, 15, 23 and 29. Claim 23 has also been amended to define R^1, R^2, R^3 and R^4. Support for this amendment to claim 23 can be found in the specification as filed. Entry of these amendments is also requested.

The specification has also been amended to correct inadvertent typographical errors which existed in Formulas (II), (III) and (IV). Specifically, Formulas (II) and (III) have been amended to place brackets around the positive ion of each of Formulas (II) and (III). Formula (IV) has been amended to place a positive charge symbol next to the positive ion in Formula (IV). No new matter has been added. One of ordinary skill in the art would recognize that the amendments made to the specification were needed to correct inadvertent typographical errors. Accordingly, entry of the amendments to the specification is respectfully requested.

Applicants have noted, with appreciation, that claims 8, 18, 26 and 32 have been objected to, but the Examiner has indicated that such claims would be allowable if rewritten in independent form.

Claims 1-11, 22-27 and 34-37 have been rejected under 35 USC §102(b) as being anticipated by Hulme et al (U.S. Patent 5,968,338)

The Examiner has suggested

> Hulme discloses the claimed method for improving the purity of an aqueous onium hydroxide, such as those claimed (columns 4-6) comprising providing the same electrochemical cell having at least 4 compartments. (See Figure. 5) charging the onium to the feed compartment formed between the first bipolar and first cation membrane (see columns 13-14), wherein the feed compartment is free of ion exchange material, passing a current through the cell and recovering a purified onium solution from the recovery compartment formed by the first cation and the second bipolar membranes (see cols. 13-14). (Pages 2-3).

Reconsideration and withdrawal of this rejection is requested since Hulme's process is different from the instantly claimed process. In Applicants' process, an impure onium hydroxide solution is charged to the feed compartment, a current is passed through the electrochemical cell and a purified onium hydroxide solution is recovered from the recovery compartment.

Although Hulme describes an electrochemical cell in Fig. 5 which is similar to the electrochemical cell illustrated in present Fig. 1, Hulme charges an onium salt to the electrochemical cell, not an onium hydroxide. The onium salt is formed by contacting a solution containing an onium compound with a cation exchange material which adsorbes the onium cations from the onium compound, and the onium cations are thereafter contacted with an acid to elute an onium salt. It is this onium salt which is then charged to the electrochemical cell. Accordingly, the presently claimed process is not anticipated by Hulme, and there is no teaching in Hulme that would suggest charging an onium hydroxide to the claimed cell. The rejection should be withdrawn.

Claims 1-11, 12-22 and 34-37 have been rejected as being anticipated by Moulton et al U.S. Patent 6,217,743 B1

The Examiner suggests:

> Moulton discloses the claimed method for improving the purity of an aqueous onium hydroxide such as those claimed (cols. 4-6) comprising providing the same electrochemical cell having at least four compartment (see Fig. 6) charging the onium to the feed compartment formed between the first bipolar and first cation membrane (see cols. 13-14), wherein the feed compartment is free of ion exchange material, passing a current through the cell and recovering a purified onium solution from the recovery compartment formed by the first cation and the second bipolar membranes (see columns 13-14). The reference further discloses the same types of impurity (cols. 6, lines 14-35) and the same type of membrane (see col. 15, lines 33-62). (Page 3).

Reconsideration and withdrawal of this rejection is requested in view of the amendment to claims 1 and 22. As noted above, these claims have been amended to specify that the "compartment adjacent to the cathode is formed by the second bipolar membrane and the cathode". Moulton neither describes or suggests such an electrochemical cell. In the electrochemical cell described by Moulton containing at least four compartments (Fig. 6), the compartment adjacent to the cathode is formed by the cathode and a second cation exchange membrane. There is no cell illustrated in Moulton wherein the compartment adjacent to the cathode is formed by a second bipolar membrane and the cathode. Thus, Moulton cannot anticipate the method of the present claims. Moreover, there is no teaching or suggestion in Moulton that would make it obvious to add a bipolar membrane between the cation selective membrane and the cathode in Moulton's electrochemical cell. The rejection should be withdrawn.

Claims 12-21 and 28-33 are rejected under 35 USC §103(a) as being unpatentable over Hulme as applied to the claims above, and further in view of Shay et al (U.S. Patent 5,833,832)

These rejected claims are directed to electrochemical cells comprising at least 5 compartments wherein the compartments are formed, in order from the anode to the

cathode, a first bipolar membrane, a first cation selective membrane, a second cation selective membrane and a second bipolar membrane (BCCB configuration). The Examiner acknowledges that Hulme does not show the arrangement of the membrane as shown in the rejected claims, but notes that Hulme does teach that one of ordinary skill in the art would find it readily apparent that additional numerous embodiments not specifically described in the figures exist within the scope of the invention (see column 12, lines 8-15).

The Shay patent is cited by the Examiner to show an embodiment that "encompasses the claimed electrochemical cell having a first and second bipolar membrane having first and second cation membranes within the bipolar membrane (see Fig. 6)" (page 5).

Thus, the Examiner concludes that the invention as a whole would have been obvious to one of ordinary skill in the art by modifying the disclosure of the Hulme patent with the teaching of the Shay patent.

The Examiner is requested to reconsider and withdraw this rejection for either or both of the following reasons:

1. The electrochemical cells described in Hulme and in Shay are utilized to produce an onium hydroxide from an onium salt, whereas the method of the present invention utilizes an electrochemical cell to purify an onium hydroxide. Neither reference charges an onium hydroxide to the cell.

2. Shay teaches that the onium salt is charged to compartment 140 (column 11, lines 35-43) which is formed by the anion selective membrane 134 and the first cation selective membrane 135. In the presently claimed process, the onium hydroxide is charged to a feed compartment formed by the first bipolar membrane and the first cation selective membrane.

Accordingly, even as the disclosures of Hulme and Shay are combined as suggested by the Examiner, the resulting process is different from the process claimed by Applicants. There is no teaching or suggestion in the two references that would make Applicants' different process obvious.

Claims 12-21 and 28-33 also have been rejected under 35 USC §103(a) as being obvious over Moulton as applied to the claims above, and further in view of Shay as applied above

Applicants respectfully request reconsideration of this rejection since there is no basis for combining the teachings of these two references. Mouton is concerned with an electrochemical cell utilized to purify onium hydroxides, whereas Shay et al are concerned with a method of preparing onium hydroxides from onium salts. In addition, whereas Moulton charges a feed of onium hydroxide to the feed compartment formed between the first bipolar membrane and the first cation selective membrane, Shay et al teach introduction of an onium salt into a feed compartment 140 formed by the first anion selective membrane 134 and the first cation selective membrane 135. The procedures described by Moulton and by Shay are so different that it would not be obvious for one skilled in the art to combine the teachings of these two references. Moreover, even if the teachings are combined, the result would not be the process presently claimed.

CONCLUSION

In view of the above comments and the present amendment, Applicants respectfully submit that all of the claims in the application are allowable.

Respectfully submitted,

RENNER, OTTO, BOISSELLE & SKLAR, LLP

By _____
Joseph J. Crimaldi
Reg. No. 41,690
for Armand P. Boisselle
Reg. No. 22,381

1621 Euclid Avenue
Nineteenth Floor
Cleveland, Ohio 44115
(216) 621-1113